

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1 (original) A method of optically determining coordinates in a predetermined space, comprising:

providing a predetermined number of pairs of light emitting elements and light detecting elements in the predetermined space defined by a predetermined number of axes;

placing each of the pairs parallel to one of the predetermined number of the axes, each of the pairs including one linearly and equidistantly placed set of the light emitting elements and another linearly and equidistantly placed set of the light detecting elements;

sequentially activating one of the light emitting elements in one of the pairs for emitting light;

inputting input coordinates in the predetermined space by interrupting the emitted light from the sequentially activated one of the light emitting elements;

detecting the light from the sequentially activated one of the light emitting elements at a plurality of predetermined ones of the light detecting elements of the one of the pairs so as to generate a detection result, the predetermined ones of the light detecting elements overlap for some of the sequentially activated ones of the light emitting elements;

repeating said sequentially activating and said detecting for each of the predetermined number of the axes; and

determining the input coordinates in the predetermined space based upon the detection result from said detecting.

2-55 (cancelled)

56 (new) A method of detecting coordinates based upon two groups of opposing pairs of light emitting elements and light detecting elements, the two groups being perpendicularly positioned along two directions and surrounding a two-dimensional coordinate input and detection area for accepting an input from a pointing means, a plurality of the light detecting elements being placed in a light emitting area of each of the light emitting elements to accept light emitted from each of the light emitting elements in an overlapping manner, comprising the steps of:

sequentially and individually activating the light emitting elements;

determining whether or not the light is interrupted along directions between activated one of the light emitting elements and the light detecting elements in the corresponding light emitting area of the activated light emitting element;

calculating two-dimensional coordinates for the input from the pointing means based upon the positions of the activated light emitting element and one or more of the light detecting elements that have detected the interruption of the light in the corresponding light emitting area, which define the interrupted light detecting elements.

57 (new) The method of detecting coordinates according to claim 56 wherein said calculating step further includes additional steps of:

determining a central detector position of one or more of the interrupted light detecting elements;

determining a minimal distance between the central detector position and one of the interrupted light detecting elements for each group of the light emitting elements and the light detecting elements; and

calculating two-dimensional coordinates for the input from the pointing means based upon the positional relation between the minimal distance and the central detector position.

58 (new) The method of detecting coordinates according to claim 57 wherein said sequentially and individually activating step includes a continuously sequential activation mode for activating every one of the linearly placed light emitting elements and a discontinuously

sequential activation mode for activating every Nth of the linearly placed light emitting elements, the discontinuously sequential activation mode being switched to the continuously sequential activation mode if it is determined that the input is placed in the coordinate input and detection area while the light emitting elements are activated in the discontinuously sequential activation mode, the continuously sequential activation mode being switched to the discontinuously sequential activation mode if it is determined that the input is not placed in the coordinate input and detection area while the light emitting elements are activated in the continuously sequential activation mode.

59 (new) The method of detecting coordinates according to claim 56 wherein said sequentially and individually activating step includes a continuously sequential activation mode for activating every one of the linearly placed light emitting elements and a discontinuously sequential activation mode for activating every Nth of the linearly placed light emitting elements, the discontinuously sequential activation mode being switched to the continuously sequential activation mode if it is determined that the input is placed in the coordinate input and detection area while the light emitting elements are activated in the discontinuously sequential activation mode, the continuously sequential activation mode being switched to the discontinuously sequential activation mode if it is determined that the input is not placed in the coordinate input and detection area while the light emitting elements are activated in the continuously sequential activation mode.

60 (new) The method of detecting coordinates according to claim 57 wherein said sequentially and individually activating step includes a continuously sequential activation mode for activating every one of the linearly placed light emitting elements and an alternate sequential activation mode for alternating the activation of every one of the linearly placed light emitting elements and every Nth of the linearly placed light emitting elements, the alternate sequential activation mode being switched to the continuously sequential activation mode if it is determined that the input is placed in the coordinate input and detection area while the light emitting elements are activated in the discontinuously sequential activation mode, the

continuously sequential activation mode being switched to the alternate sequential activation mode if it is determined that the input is not placed in the coordinate input and detection area while the light emitting elements are activated in the continuously sequential activation mode.

61(new) The method of detecting coordinates according to claim 56 wherein said sequentially and individually activating step includes a continuously sequential activation mode for activating every one of the linearly placed light emitting elements and an alternate sequential activation mode for alternating the activation of every one of the linearly placed light emitting elements and every Nth of the linearly placed light emitting elements, the alternate sequential activation mode being switched to the continuously sequential activation mode if it is determined that the input is placed in the coordinate input and detection area while the light emitting elements are activated in the discontinuously sequential activation mode, the continuously sequential activation mode being switched to the alternate sequential activation mode if it is determined that the input is not placed in the coordinate input and detection area while the light emitting elements are activated in the continuously sequential activation mode.

62 (new) A method of detecting coordinates indicated by a pointing unit, comprising the steps of:

- providing a pair of a plurality of light emitting elements and a plurality of light detecting elements;

- placing the pair of the light emitting elements and the light detecting elements in a substantially perpendicular position; and

- placing the light detecting elements above the light emitting elements.

63 (new) The method of detecting coordinates according to 62 wherein a number of the light detecting elements is assigned to accept light emitted from each of the light emitting elements.

64 (new) A method of detecting coordinates indicated by a pointing unit, comprising the steps of:

providing a pair of a plurality of light emitting elements and a plurality of light detecting elements;

placing the pair of the light emitting elements and the light detecting elements in a substantially opposing position; and

assigning a number of the light detecting elements to accept light emitted from each of the light emitting elements.

65 (new) A storage medium containing computer instructions for detecting coordinates based upon two groups of opposing pairs of light emitting elements and light detecting elements, the two groups being perpendicularly positioned along two directions and surrounding a two-dimensional coordinate input and detection area for accepting an input from a pointing means, a plurality of the light detecting elements being placed in a light emitting area of each of the light emitting elements to accept light emitted from each of the light emitting elements in an overlapping manner, the computer instructions performing the tasks of:

sequentially and individually activating the light emitting elements;

determining whether or not the light is interrupted along directions between activated one of the light emitting elements and the light detecting elements in the corresponding light emitting area of the activated light emitting element;

calculating two-dimensional coordinates for the input from the pointing means based upon the positions of the activated light emitting element and one or more of the light detecting elements that have detected the interruption of the light in the corresponding light emitting area, which define the interrupted light detecting elements.

66 (new) The storage medium containing computer instructions for detecting coordinates according to claim 65 wherein said calculating step further includes additional steps of:

determining a central detector position of one or more of the interrupted light detecting elements;

determining a minimal distance between the central detector position and one of the interrupted light detecting elements for each group of the light emitting elements and the light detecting elements; and

calculating two-dimensional coordinates for the input from the pointing means based upon the positional relation between the minimal distance and the central detector position.

67 (new) The storage medium containing computer instructions for detecting coordinates according to claim 66 wherein said sequentially and individually activating step includes a continuously sequential activation mode for activating every one of the linearly placed light emitting elements and a discontinuously sequential activation mode for activating every Nth of the linearly placed light emitting elements, the discontinuously sequential activation mode being switched to the continuously sequential activation mode if it is determined that the input is placed in the coordinate input and detection area while the light emitting elements are activated in the discontinuously sequential activation mode, the continuously sequential activation mode being switched to the discontinuously sequential activation mode if it is determined that the input is not placed in the coordinate input and detection area while the light emitting elements are activated in the continuously sequential activation mode.

68 (new) The storage medium containing computer instructions for detecting coordinates according to claim 65 wherein said sequentially and individually activating step includes a continuously sequential activation mode for activating every one of the linearly placed light emitting elements and a discontinuously sequential activation mode for activating every Nth of the linearly placed light emitting elements, the discontinuously sequential activation mode being switched to the continuously sequential activation mode if it is determined that the input is placed in the coordinate input and detection area while the light emitting elements are

activated in the discontinuously sequential activation mode, the continuously sequential activation mode being switched to the discontinuously sequential activation mode if it is determined that the input is not placed in the coordinate input and detection area while the light emitting elements are activated in the continuously sequential activation mode.

69 (new) The storage medium containing computer instructions for detecting coordinates according to claim 66 wherein said sequentially and individually activating step includes a continuously sequential activation mode for activating every one of the linearly placed light emitting elements and an alternate sequential activation mode for alternating the activation of every one of the linearly placed light emitting elements and every Nth of the linearly placed light emitting elements, the alternate sequential activation mode being switched to the continuously sequential activation mode if it is determined that the input is placed in the coordinate input and detection area while the light emitting elements are activated in the discontinuously sequential activation mode, the continuously sequential activation mode being switched to the alternate sequential activation mode if it is determined that the input is not placed in the coordinate input and detection area while the light emitting elements are activated in the continuously sequential activation mode.

70 (new) The storage medium containing computer instructions for detecting coordinates according to claim 65 wherein said sequentially and individually activating step includes a continuously sequential activation mode for activating every one of the linearly placed light emitting elements and an alternate sequential activation mode for alternating the activation of every one of the linearly placed light emitting elements and every Nth of the linearly placed light emitting elements, the alternate sequential activation mode being switched to the continuously sequential activation mode if it is determined that the input is placed in the coordinate input and detection area while the light emitting elements are activated in the discontinuously sequential activation mode, the continuously sequential activation mode being switched to the alternate sequential activation mode if it is determined that the input is not

placed in the coordinate input and detection area while the light emitting elements are activated in the continuously sequential activation mode.

71 (new) A storage medium containing computer instructions for detecting coordinates indicated by a pointing unit, the computer instructions comprising the tasks of:

- providing a pair of a plurality of light emitting elements and a plurality of light detecting elements;

- placing the pair of the light emitting elements and the light detecting elements in a substantially perpendicular position; and

- placing the light detecting elements above the light emitting elements.

72 (new) The storage medium containing computer instructions for detecting coordinates according to 16 wherein a number of the light detecting elements is assigned to accept light emitted from each of the light emitting elements.

73 (new) A storage medium containing computer instructions for detecting coordinates indicated by a pointing unit, the instructions comprising the tasks of:

- providing a pair of a plurality of light emitting elements and a plurality of light detecting elements;

- placing the pair of the light emitting elements and the light detecting elements in a substantially opposing position; and

- assigning a number of the light detecting elements to accept light emitted from each of the light emitting elements.

74 (new) A system for detecting coordinates based upon two groups of opposing pairs of light emitting elements and light detecting elements, the two groups being perpendicularly positioned along two directions and surrounding a two-dimensional coordinate input and detection area for accepting an input from a pointing means, a plurality of the light detecting elements being placed in a light emitting area of each of the light emitting elements to accept light emitted from each of the light emitting elements in an overlapping manner, comprising:

a light emitting control for sequentially and individually activating the light emitting elements;

an interruption determination unit connected to said light emitting control for determining whether or not the light is interrupted along directions between activated one of the light emitting elements and the light detecting elements in the corresponding light emitting area of the activated light emitting element;

a coordinate calculation unit connected to said determination unit for calculating two-dimensional coordinates for the input from the pointing means based upon the positions of the activated light emitting element and one or more of the light detecting elements that have detected the interruption of the light in the corresponding light emitting area, which define the interrupted light detecting elements.

75 (new) The system for detecting coordinates according to claim 74 wherein said coordinate calculation unit further comprises:

a central position determination unit for determining a central detector position of one or more of the interrupted light detecting elements;

a minimal distance determination unit connected to said central position determination unit for determining a minimal distance between the central detector position and one of the interrupted light detecting elements for each group of the light emitting elements and the light detecting elements; and

a calculation unit connected to said minimal distance determination unit for calculating two-dimensional coordinates for the input from the pointing means based upon the positional relation between the minimal distance and the central detector position.

76 (new) The system for detecting coordinates according to claim 75 wherein said light emitting control activates every one of the linearly placed light emitting elements in a continuously sequential activation mode and every Nth of the linearly placed light emitting elements in a discontinuously sequential activation mode, the discontinuously sequential activation mode being switched to the continuously sequential activation mode if said

interruption determination unit determines that the input is placed in the coordinate input and detection area while the light emitting elements are activated in the discontinuously sequential activation mode, the continuously sequential activation mode being switched to the discontinuously sequential activation mode if said interruption determination unit determines that the input is not placed in the coordinate input and detection area while the light emitting elements are activated in the continuously sequential activation mode.

77 (new) The system for detecting coordinates according to claim 74 wherein said light emitting control activates every one of the linearly placed light emitting elements in a continuously sequential activation mode and every Nth of the linearly placed light emitting elements in a discontinuously sequential activation mode, the discontinuously sequential activation mode being switched to the continuously sequential activation mode if said interruption determination unit determines that the input is placed in the coordinate input and detection area while the light emitting elements are activated in the discontinuously sequential activation mode, the continuously sequential activation mode being switched to the discontinuously sequential activation mode if said interruption determination unit determines that the input is not placed in the coordinate input and detection area while the light emitting elements are activated in the continuously sequential activation mode.

78 (new) The system for detecting coordinates according to claim 75 wherein said light emitting control activates every one of the linearly placed light emitting elements in a continuously sequential activation mode and every Nth or every one of the linearly placed light emitting elements in an alternate sequential activation mode, the alternate sequential activation mode being switched to the continuously sequential activation mode if said interruption determination unit determines that the input is placed in the coordinate input and detection area while the light emitting elements are activated in the alternate sequential activation mode, the continuously sequential activation mode being switched to the alternate sequential activation mode if said interruption determination unit determines that the input is not placed in the

coordinate input and detection area while the light emitting elements are activated in the continuously sequential activation mode.

79 (new) The system for detecting coordinates according to claim 74 wherein said light emitting control activates every one of the linearly placed light emitting elements in a continuously sequential activation mode and every Nth or every one of the linearly placed light emitting elements in an alternate sequential activation mode, the alternate sequential activation mode being switched to the continuously sequential activation mode if said interruption determination unit determines that the input is placed in the coordinate input and detection area while the light emitting elements are activated in the alternate sequential activation mode, the continuously sequential activation mode being switched to the alternate sequential activation mode if said interruption determination unit determines that the input is not placed in the coordinate input and detection area while the light emitting elements are activated in the continuously sequential activation mode.

80 (new) A system for detecting coordinates indicated by a pointing unit, comprising:

- an input area for inputting an input;
- a plurality of light emitting elements for emitting light and a plurality; and
- a plurality of corresponding light detecting elements for detecting the light emitted from said light emitting elements, wherein said light emitting elements and said light detecting elements are placed in a substantially perpendicular position and said light detecting elements are placed above the light emitting elements in the input area.

81 (new) The system for detecting coordinates according to 25 wherein a number of the light detecting elements is placed to accept light emitted from each of the light emitting elements.

82 (new) A system for detecting coordinates indicated by a pointing unit, comprising:

- an input area for inputting an input;
- a plurality of light emitting elements for emitting light and a plurality; and

a plurality of corresponding light detecting elements for detecting the light emitted from said light emitting elements, wherein said light emitting elements and said light detecting elements are placed in a substantially opposing position, a number of said light detecting elements is positioned to accept light emitted from each of said light emitting elements.